Assessing cost-effectiveness impacts of CDRFI implementation under the InsuResilience Vision 2025

Assessment of indicator 4.a on the Basis risk monitoring

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Contents

Executive Summary

In 2019, the InsuResilience Global Partnership (IGP) launched Vision 2025 to strengthen resilience in developing countries and protect poor and vulnerable people from climate shocks and disasters with faster, more reliable, and cost-effective responses. As part of the ongoing efforts to track progress under **Vision 2025**, the Global Shield Secretariat has commissioned Oxford Policy Management (OPM) to conduct three studies on the three indicators under result area 4[1]. The three indicators assess the **cost-effectiveness of Climate and Disaster Risk Finance and Insurance (CDRFI) solutions: a) Basis risk monitoring, b) low cost of providing coverage, and c) competitiveness of the private insurance markets.** These studies complement and validate the data acquired through annual data collections under Vision 2025, which is predominantly self-reported.

The primary objectives of the three studies are to **evaluate the impact and progress made in achieving the targets set under the aforementioned indicators and to contribute to the evidence base on cost-effectiveness of CDRFI more broadly.** Field research was conducted on a small, randomly selected sample of active macro-, meso-, and micro-level CDRFI solutions across fourteen countries (Colombia, Burkina Faso, Ethiopia, Fiji, Kenya, Madagascar, Malawi, Mauritania, Mexico, Nigeria, Rwanda, Pakistan, Solomon Islands, and Tchad). It is important to consider the small sample size when reviewing the results. Additionally, a major challenge in conducting these studies was the low response rate, which further reduced the already limited sample size.

Nonetheless, the findings from these studies offer valuable insights into the fourteen countries where the sampled projects and products are implemented, with a particular focus on the four selected countries (Colombia, Fiji, Kenya, and Pakistan) used for case studies under indicator 4.c. The results shed light **on how basis risk is being managed in relevant programs contributing to Vision 2025, on how these programs are ensuring low cost of financial protection in climate vulnerable contexts, and on the competitiveness of insurance markets,** all of which are relevant for protection of vulnerable people from climate risks. These insights thus contribute to the global knowledge base and could inspire further research activities on cost-effectiveness of CDRFI.

This report focuses on the management of basis risk. The findings reveal that **the majority of the surveyed index-based solutions met the high-quality basis risk monitoring criteria under Vision 2025,** indicating a solid understanding on the importance of basis risk monitoring to increase the effectiveness and reliability of products. However, gaps persist in **updating protocols and dedicating budget for basis risk management.** Addressing these gaps can significantly enhance the accuracy and reliability of index-based solutions, ensuring better protection and support for vulnerable communities by reducing discrepancies between predicted and actual losses.

[1]The indicators under Result Area 4 cover cost-effectiveness from various perspectives. Indicator 4.a measures the extent of basis risk monitoring for index-based solutions. Indicator 4.b evaluates the costliness of products, ensuring costs are not excessive but sufficient to support high-quality product development. Indicator 4.c examines the competitiveness of the insurance market. Finally, Indicator 4.d assesses how well donor-supported projects promote pro-poor outcomes in vulnerable countries. For further details on Vision 2025 and its indicators, please refer to: Vision 2025.

Introduction

The Vision 2025 Indicator 4.a is designed to capture the extent to which index-based schemes account for basis risk. Basis risk illustrates the degree to which losses experienced may differ from the payment received under the contract designed to cover losses. Three sources for basis risk in index-based products include model error, uncertainty over the context of the outcomes, and misunderstanding or miscommunication of the model's capabilities. Basis risk is unavoidable as models cannot accurately capture reality; however, this indicator focuses on how basis risk can be mitigated as far as possible through risk management strategies. As such, this Vision 2025 indicator considers the approaches taken by programmes to reduce risk and gather additional data to support better measurement.

Table 1 Indicator summary

Result Area 4	Target	Criteria	IGP's Current Reporting Status
Basis risk monitoring (the extent to which basis risk is monitored for index-based insurance schemes).	All index-based products meet at least two of the criteria for high-quality basis risk monitoring.	The monitoring plan is available, and we have received a copy. It has a person responsible for implementation, the limitations of the plan are known, and it has a budget. There is a protocol in place for updates to the basis risk. The protocol includes an objective way to resolve data divergence and resolve conflicts and/or a global arbitrator is identified and/or other relevant strategies are employed to operate the protocol. Comparative monitoring is in place by means of additional data collection and involvement of an external party. This monitoring also has an allocated budget.	34.7% of all index-based projects under implementation meet the target of the indicator.

This summary report presents IGP's progress against targets described in **Table 1** and details the results. This research is limited to assessing the indicators and parameters set out in the IGP M&E framework. Therefore, it does not provide an in-depth assessment of basis risk monitoring across the sampled products. The small sample size (see **Table 2** below) should be considered when reviewing the findings. While conducting this study, an overall challenge was the low response rate received,

which considerably impacted the already relatively small sample size. For example, the data collected for all macro-level schemes was derived from one interview with two programmes covering 7 sovereign risk transfer schemes.

Moreover, a 55% response rate across macro, meso and micro level products was achieved. Of this, only one meso-level product was able to be consulted. Therefore, the results of this research should not be seen as representative but rather as a contribution to broader growing evidence on climate insurance. **Table 2** outlines the response rate in more detail. **Annex A** includes the descriptions of the assessment methodologies.

Table 2 Indicator 4.a response rate

	Indicator 4.a			
	Intended number of sample projects[2]	**No. of responses received**	**%**	**Countries**
n. schemes	**20**	**11**	55%	Malawi, Mauritania, Tchad, Burkina Faso, Madagascar, Mexico, Ethiopia
Macro schemes	**8**	**7**	87.5%	-
Contingent credit	-	-	-	-
Sovereign Risk Transfer	8	**7**	87.5%	Malawi, Mauritania, Tchad, Burkina Faso, Madagascar
Sub-Sovereign Risk Transfer	-	-	-	-
Meso-micro schemes	**12**	**4**	33%	-
Corporate or Institutional Risk Transfer	6	**1**	16.7%	Mexico
Microinsurance Households	5	**3**	60%	Burkina Faso, Ethiopia
Microinsurance Business	1	-	-	-

Context

[2] Sampled projects were selected via stratified randomisation for appropriate split of products across different geographies, types of CDRFI instruments, scales (macro/meso/micro) and perils.

All programmes interviewed, aside from one meso insurance business scheme in Mexico, have had payouts triggered. The implementation timeframe across all programmes spans from 2014 until now, with one product still in development and due to be implemented in 2025/2026. For products that triggered payouts, interviewees stated that a payout will always occur when the index has been triggered. However, **the majority of interviewees stated that it is often difficult to determine whether the index may not be perfectly aligned** and whether this has resulted in higher or lower payouts than actual losses incurred.

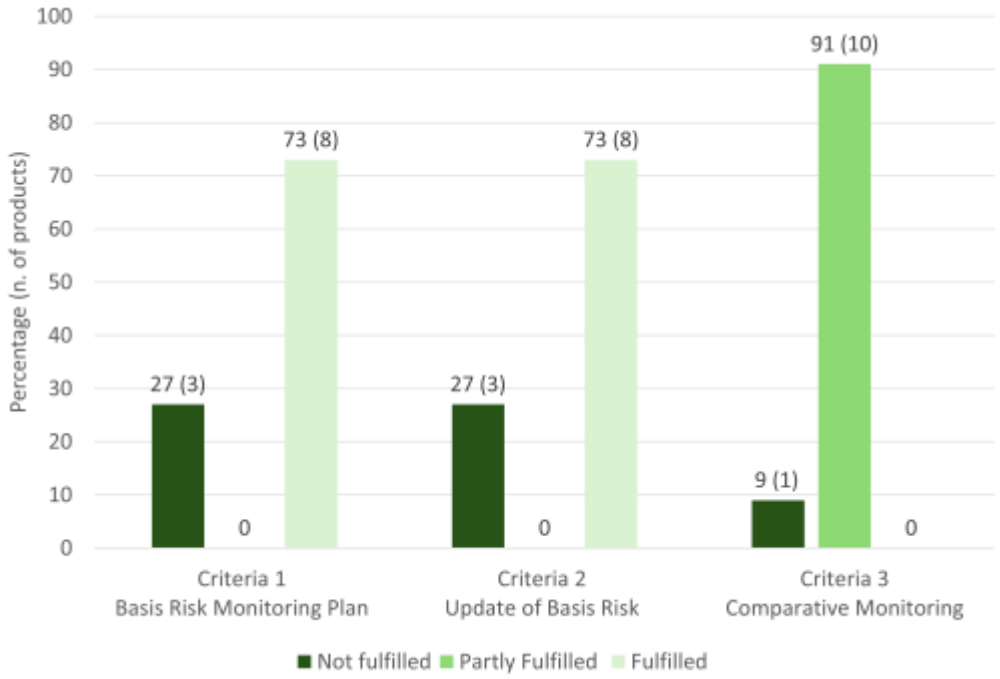
Some of the **relevant factors** mentioned that contribute to the challenge of determining whether the index is perfectly aligned include: (1**) other risk drivers,** therefore making it difficult to determine actual loss experienced as it pertains to the insured peril, for example, differentiating risk drivers for macro products which have food insecurity as a protection objective; (2) the **expectation of policyholders** to receive a payout, therefore making it more likely for policymakers to raise a complaint on the grounds of basis risk in instances where losses have been incurred but no payout has been made; and (3) because **products generally do not measure actual loss,** it is difficult to determine whether the payout made is sufficient.

Interviewees also flagged that **for macro-level products, some countries expect payouts from risk pools to cover all losses or disaster response needs. However, the policy that has been bought will not be enough to cover all losses, regardless of how much basis risk exists within the index.** Interviewees stated that managing policyholder expectations can be challenging at times. Managing policyholder expectations is also often the case for meso-micro level products. Where there had been a recognised mismatch between payout and actual losses, i.e., the payout was lower than actual losses, interviewees either reassessed the basis risk and adjusted the index trigger or changed the design of the index. For example, the Ethiopia R4 Resilience Initiative changed the design of its model in 2023 from Weather Index Insurance (WII) to Area Yield Index (AYI) to reduce basis risk by incorporating a heavier research element based on aggregate yield data. On the other hand, products can also adjust the index trigger to either a higher or lower threshold based on comparative monitoring and additional research to ensure that payouts reflect the true losses incurred.

Performance results

Basis risk is inherent to index insurance products. This Vision 2025 indicator captures the extent to which index-based schemes fulfil core requirements to limit the risk. Under this target, progress is tracked against three criteria (please see **Table 1** for a breakdown). **Figure 1** summarises the information provided by the 11 products interviewed across these criteria.

Figure 1 Percentage of products meeting the Vision 2025 criteria



Accumulatively, **data collected suggests that 73% of the products sampled met the IGP target**. In other words, 8 out of 11 products fulfilled at least 2 criteria. This is higher than the reporting data outlined in **Table 1** (34.7%)[3]. All interviewees stated that they had a basis risk monitoring plan; however, the degree to which this was documented and well-developed varies. Of all 11 products interviewed, 8 provided us with their basis risk monitoring plan, 8 stated that there is a protocol in place to update the basis risk, and 10 stated that they collect additional data to inform the model.

[3] These results should be read considering that 7 of these 11 products are promoted by two programmes.

Criteria specific assessment

Of the 11 products surveyed, all claimed to have a basis risk monitoring plan. However, these varied in scope and formality.

Table 3 Products that met the breakdown of Criteria 1

Criteria 1: Basis Risk Monitoring				
Basis Risk Monitoring plans available	Basis risk monitoring plans received	Person responsible for implementation	Limitations and focus of the plan are known	Budget allocated to basis risk monitoring
100%	73%	100%	91%	0%

For criteria 1 to be fulfilled, a copy of the basis risk plan also had to be received. Yet only 8 basis risk monitoring plans were collected. **Figure 1** shows that only 73% met IGP criteria 1. For example, some interviewees stated that there was a plan, but this was not outlined within a specific document. Others have a plan that is in development but forms part of a wider 4-step initiative to improve the overall product. On the other hand, the sovereign risk transfer instruments include basis risk monitoring as part of a wider iterative design concept, which contains country-specific seasonal feedback mechanisms, technical working groups, and customisation reports that review payouts – all of which seek to validate the model. This allows for ongoing feedback to ensure that payouts remain as reflective of the ground reality as possible. These sovereign risk transfer instruments also manage the payout expectations of policyholders by using historical payout years as a benchmark. This aims to create transparency and act as a point of reference for policyholders to understand the link between the losses incurred by the peril and the payout received.

Table 4 Products that met the breakdown of Criteria 2

Criteria 2: Update of Basis Risk				
Protocol in place for updates of the basis risk	Protocol includes an objective way to resolve data divergence	Protocol includes an objective way to resolve conflicts and disagreements at the end of the risk period	A global arbitrator is identified to solve disputes	Other relevant strategies are in place to operate the protocol to update basis risk
73%	73%	73%	0%	73%

For products that stated that they had a specific protocol for updating basis risk, this involved using additional data, e.g., secondary satellite data, to assess the trigger of the model. Products with no protocol stated that this was either not yet set up as the product was still in the early stages of development or that it was not yet a formalised process. Instead, the model is updated as and when instances of deviance occur.

Table 5 Products that met the breakdown of Criteria 3

Criteria 3: Comparative Monitoring			
Comparative monitoring is in place	Additional data are collected	An external party is involved	There is a budget allocated for the monitoring
91%	91%	27%	0%

Of the 10 programmes surveyed where comparative monitoring takes place, interviewees stated that no budget was allocated. This was because either all information is open source or activities of this kind are costed on an ad hoc basis under a wider monitoring budget for the project. However, where additional data was collected, this included, inter alia, economic household surveys, historical data (e.g., crop yield data), open-source data of other risk drivers, additional satellite data to compare the model, and field/site visits.

Cross-cutting themes and challenges

Common challenges in measuring basis risk cited by interviewees include being unable to discern whether there has been a payout discrepancy. Key factors are highlighted in the **Context** section. However, interviewees reported difficulty measuring actual loss and, therefore, faced challenges ensuring the model's accuracy where the payout is a lump sum. One interviewee stated that not measuring actual loss and only measuring estimated loss can be attributed to the nature of index-based insurance. It could, therefore, be inferred that measuring actual loss is deemed out of scope for basis risk monitoring for some insurance schemes. Interviewees broadly agreed that infrequently updated data limits model accuracy. For example, source data providers can sometimes be unresponsive, delaying payout times. Interviewees for sovereign insurance products agreed that it was difficult to determine whether payouts were incorrect. Interviewees suggest that this is because perils generally affect people differently based on exposure, vulnerability, and household resilience, creating a level of subjectivity when it comes to determining whether the payout was sufficient to meet disaster response and recovery costs and, subsequently, household needs.

Products that collect comparative open-source data and do not engage with external parties expressed that this is primarily to provide transparency to policyholders. They can view the same data and, therefore, gain a better understanding of how the model works and how payouts are made, which aims to foster trust in the model. Open-source data was also seen as more cost-effective.

In the case of, where additional data was not collected, the interviewee stated that this was deemed unnecessary due to the socio-economic context. Unlike in other more fragile contexts in Africa or Asia, there would not be other risk drivers. For this product, the policyholder sees the focus of the insurance as largely obtaining access to credit for their commercial product.

More broadly, macro-level schemes had more comprehensive basis risk monitoring than meso-micro-level schemes. Sovereign risk transfer products, for example, included iterative feedback loops with country-specific technical working groups based on seasonal feedback monitoring and mid- and end-line reporting. The programme also developed country customisation reports which included historical data on correct or incorrect payouts (or lack thereof) to support model validation. On the other hand, meso-micro level schemes were generally not as comprehensive. They were more likely to have basis risk monitoring plans that were either still in development or undocumented.

Key takeaways

Despite limited available data due to the small sample size of this research, **this summary report finds that 73% of the surveyed products meet Vision 2025 criteria for high-quality basis risk monitoring.** However, it should be reiterated that most surveyed products were supported by two programmes, which is likely to have impacted overall findings. Overall, all interviewees understood the importance of measuring and updating basis risk and all but one was aware of the current model's limitations. There was variance in the extent to which basis risk was documented. Where basis risk monitoring did have a documented plan, this was seldom accompanied by an additional documented protocol for how updates would be incorporated into the model for instances where payouts did not meet losses incurred (e.g., an objective way to resolve data divergence, an arbitrator to resolve conflict or other relevant strategies). Moreover, no product claimed to have a separate basis risk budget.

A future area of focus among index-based insurance programmes could be to explore whether there are bottlenecks hindering the development and documentation of basis risk monitoring, including accompanying protocols and separate budgets.

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Annex A Indicator 4.a – Assessment criteria

Indicator 4.a Basis Risk Monitoring	
Basis Risk - Monitoring plan	
fully	*Compulsory conditions:* a. The monitoring plan is available (yes under col. N), b. We received a copy of the plan (col. W) *At least 2 out of 3 conditions:* c. It has person who is responsible for its implementation (col. P) d. Limitations and focus of the plan are known (col. R and S) e. The plan has a budget (col. T)
partly	At least conditions (a) and (b) are fulfilled
not fulfilled	Conditions (a) and/or (b) are not fulfilled

Update of basis risk	
fully	*Compulsory condition:* a. There is a protocol in place for the update of the basis risk (col. Z) *At least 2 out of the following conditions (notes in col. AA):* *b* .The protocol includes an objective way to resolve data divergence c.The protocol includes an objective way to resolve conflicts and disagreements at the end of the risk period d. A global arbitrator is identified to solve disputes between clients and financial or model
partly	At least condition (a) is fulfilled
not fulfilled	Condition (a) is not fulfilled

Comparative monitoring	
fully	*Compulsory conditions:* a. Additional data are collected (col. AC) b. An external party is involved (col. AF) c. There is a budget allocated for the monitoring (AI)
partly	Only condition (a) is fulfilled.
not fulfilled	Condition (a) is not fulfilled